SOARING SAFETY FOUNDATION

2005 SAFETY REPORT

SOARING SAFETY FOUNDATION

PREFACE

In 1985 the Soaring Society of America (SSA) formally created the Soaring Safety Foundation (SSF). The SSF was tasked with 2 major objectives, (1) to develop methods and techniques that would promote soaring safety in the United States; and (2) review and disseminate flight training information and material. These tasks had previously been performed by several subcommittees of the SSA Board of Directors. The creation of the SSF allowed these tasks to be focused in a single organization whose main mission is the promotion of soaring safety.

The compilation and dissemination of accident data have become one of the Soaring Safety Foundation's most important functions. Analysis of this information is crucial because it allows the SSF to identify and evaluate emerging accident trends within the soaring community. It also focuses accident prevention resources on specific problem areas that have a negative impact on the safety of our sport.

Accident data included in this report was obtained from two primary sources: the National Transportation Safety Board (NTSB) accident reports and the Federal Aviation Administration (FAA) daily reporting system. These sources were selected because of the specific reporting requirements specified in the Code of Federal Regulations NTSB Part 830. Although it would be ideal to include all accident and incident reports involving gliders, it becomes extremely difficult to confirm accurate reporting from the various entities involved. Consequently, the SSF elected to take advantage of the standardized reporting requirements of NTSB Part 830 to develop its data base of soaring accident information. This data base is then used to develop accident prevention strategies and to continuously improve training methods to reduce the number of soaring accidents.

The information contained in this report represents data compiled by the SSF and reported in **Soaring** Magazine, Flight Instructor Refresher Clinics, at pilot safety seminars, and on the **SSF web site (http://www.soaringsafety.org)**.

Funding for the SSF is obtained through donations from individuals and organizations interested in the promotion of soaring safety. These funds are then used to develop and promote programs such as soaring safety seminars, flight instructor refresher clinics, posters, safety-related articles in *Soaring* Magazine, the SSF web site, and the newsletter of the SSF, *Sailplane Safety*. The Trustees of the Soaring Safety Foundation sincerely hope that this report and the publication of accident data are beneficial in assisting members of the soaring community in developing a greater awareness of current issues and emerging trends in soaring safety.

Additional copies of this report may be obtained from the Soaring Safety Foundation web site http://www.soaringsafety.org. Select the "Accident Prevention – SSF Reports" tab or write to:

Soaring Safety Foundation
26260 W. Airport Rd.
Minooka, IL 60447
Richard Carlson <rcarlson501@comcast.net>
E. Gene Hammond <grauchy@sbcglobal.net>

EXECUTIVE SUMMARY

A cursory look at the 2005 soaring accident rates shows both good and bad news. The bad news is that the number of accidents increased slightly from the previous year, yet with the small SSA membership growth the percentage of accidents per SSA member rose a statistically insignificant 0.02%. The good news is that there were two fewer fatalities than in 2004, however the drops due to no towplane or motorglider pilots receiving fatal injuries were offset by an increase in the number of fatally injured glider pilots

As noted below, the long term trend for fatal accidents has also reached a plateau. However pilots should note that in 1993 there were zero fatalities, and the SSF trustees see no reason why we can't achieve this goal again. Every US glider pilot should dedicate themselves to the goal of making a significant long term reduction in the number of fatal soaring accidents.

For the twelve month period ending December 31, 2005, 33 glider, motorglider, or towplane accidents meeting the reporting requirements of Part 830 of the Code of Federal Regulations were reported to the National Transportation Safety Board. The number of accidents reported during 2005 represents an increase of 12.1% in the number of accidents compared to the 29 accidents reported during 2004. The five-year average for the 2001 – 2005 reporting period is 32.0 accidents per year, a number that remains constant from the previous reporting period.

While the average number of accidents has shown a steady decline since 1981 (averaging 45.6/year in the 80's, 38.6/year in the 90's and 32.2/year so far this decade) the yearly number of accidents remains unacceptably high. In addition, the average number of fatalities has remained just over 6 per year since the mid 1990's. In the 2005 reporting period six accidents resulted in fatal injuries to the pilot. In addition to the six fatalities, five pilots and one passenger received serious injuries while twenty-two pilots and six passengers received minor or no injuries during the 2005 reporting period. In a change from last year, no motorglider or tow plane pilots received fatal injuries in accidents involving accidents in those aircraft.

As the 2005 statistics show, the majority of soaring accidents occur in the approach and landing phase of flight. For one reason or another, the pilot fails to make it to the landing area. Pilots need to consider multiple factors including: other traffic, wind, lift/sink, location, and distance remaining to the landing area in order to safely land a glider. Failure to account for one or more of these factors can leave the pilot low on the approach - leading to an undershoot, or too high on the approach – leading to an overshoot.

Pilots should consider that there are numerous 'tools' or maneuvers that can be used to correct an overshoot condition. These include slips (forward and turning), more spoilers, full spoilers plus increased airspeed, and 'S' turns on final. These flight maneuvers increase the sink rate of the glider – allowing for a steeper approach, or increase the flight time – allowing the glider to loose more altitude. In contrast closing the spoilers and increasing the airspeed is the only available 'tool' when the undershoot condition is detected. Pilots should practice, with a qualified instructor, the techniques and maneuvers needed to land safely from an overshoot condition, and they should refrain from putting themselves in an undershoot position.

One new tool that pilots and instructors should consider is that GPS recorder you installed to document your flight. Low-cost hand-help GPS units are available on the used market and can be carried in the training glider. The approach and landing portion of the flight can be extracted from the recorder and displayed to determine how the pilot is handling various conditions. It is also possible to download other pilot's traces from multiple Internet web sites (e.g., OLC) and examine how others tackle this demanding task.

Takeoff accidents, though rare, are particularly frustrating because they usually avoidable. Both glider and launch vehicle are sitting on the ground before the launch begins. In 2005 two accidents occurred after the glider pilot intentionally terminated the tow at low altitude and then failed to execute the appropriate emergency landing procedures. In addition, two tow-planes were substantially damaged when they ran out of fuel during a tow operation. Pilots can mentally prepare for an emergency and develop a specific set of action plans to deal with several contingencies. The task is then to execute the proper plan at the proper time. Flight instructors should continue to emphasize launch emergencies during flight reviews, club check rides and flight training.

Adding the letter "E" to the pre-takeoff checklist is a helpful reminder to concentrate on the emergency plan of action. Treating the wing runner as a member of the launch crew and using good Crew Resource Management (CRM) techniques can reduce the pilot's pre-launch workload. The wing runner can remind the pilot of the possibility of a launch emergency ("Are you ready for an emergency?") and be observant for various discrepancies such as: dive brakes left open, canopy unlatched, tail dolly left on, or positive control check not accomplished.

The tow pilot also needs special training to be alert for signs of potential trouble. Is the glider pilot being hurried? Are conditions too gusty; is there fuel in the tow plane? Is the takeoff area clear of people and other obstructions? Has the tow pilot added the letter "E" to the pre-takeoff checklist and is he/she prepared for an emergency? Tow planes need a good rear view mirror, one that is located close to the tow pilot. Radios are highly recommended.

Motorglider pilots also have an additional responsibility during self-launch operations. They are the tow pilot and thus need to consider everything listed above. Fixing any problem before beginning a launch will help reduce the take-off type of accident.

Flight instructors play an important safety role during everyday glider operations. They need to supervise flying activities and serve as critics to any operation that is potentially unsafe. Other pilots and people involved with the flying activity also need to be trained to be alert to any safety issues during the daily activity.

All these tasks need to be performed on every flight. Failure to do so can result in another accident.

TABLE OF CONTENTS

SOARING SAFETY FOUNDATION

ANNUAL SAFETY REPORT

2005

A cursory look at the 2005 soaring accident rates shows both good and bad news. The bad news is that the number of accidents increased slightly from the previous year, yet with the small SSA membership growth the percentage of accidents per SSA member rose a statistically insignificant 0.02%. The good news is that there were two fewer fatalities than in 2004, however the drops due to no towplane or motorglider pilots receiving fatal injuries were offset by an increase in the number of fatally injured glider pilots.

For many reasons[1], this report represents an incomplete view of the accidents involving US glider pilots. Despite these limitations, this annual report is published to highlight some of the accidents listed in the NTSB aviation accident database. Examination of these accidents can help point out trends and issues that need to be resolved. Safety is everyone's business, every glider pilot must continuously examine their flying skills, proficiency, and decision making skills to ensure every flight ends with a safe arrival at the intended point of landing.

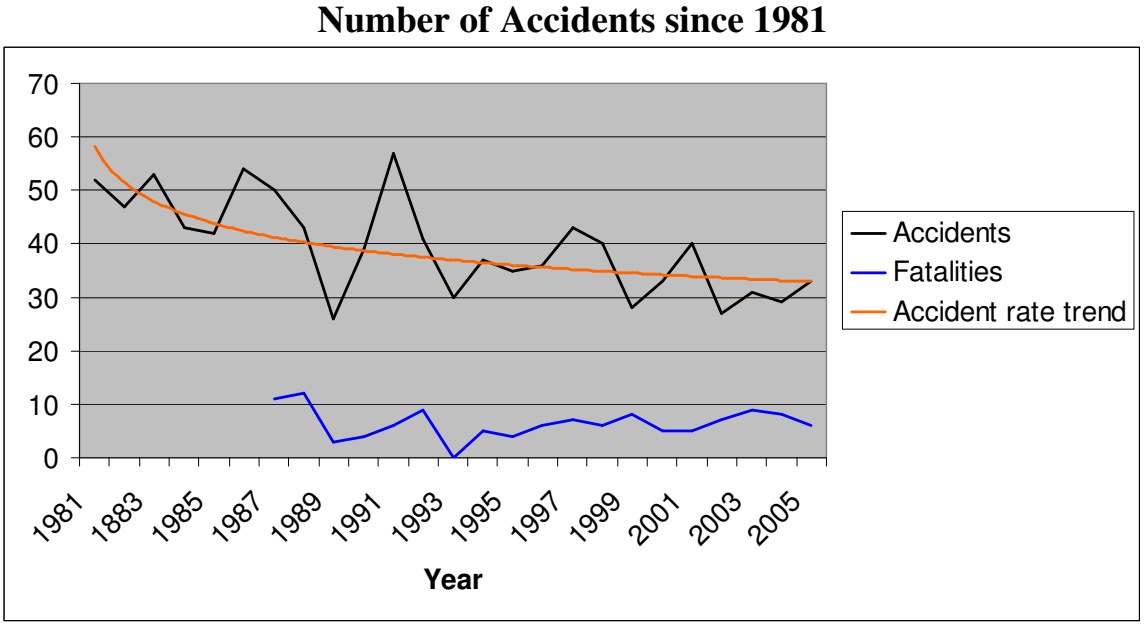


Figure 1 Number of total and fatal accidents on a per year basis.

Figure 1 shows the total number of accidents and fatalities from 1981 to the present. As the figure shows, there is a large variation in the number of accidents each year. While the overall trend is good, the graph clearly shows a plateau is being reached. As every instructor knows, plateaus are a normal part of the learning process. The SSF trustees believe that the soaring community can overcome this problem and force another major reduction in the annual number of soaring accidents.

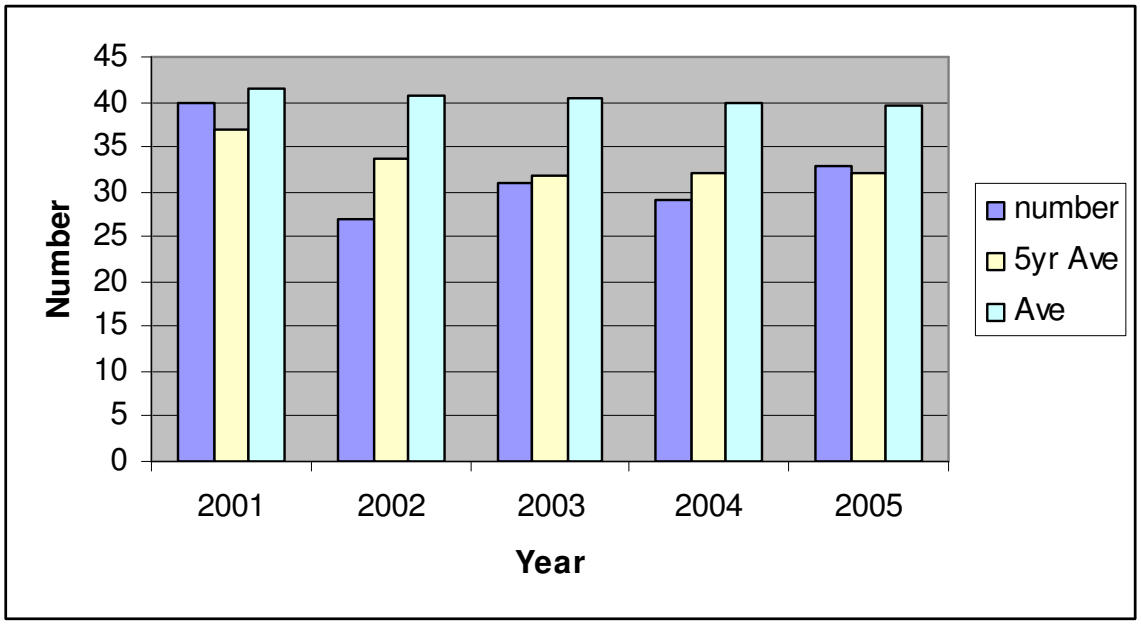
[1] See Appendix A for a detailed list of reasons and steps you can take to address these issues.

As this figure also shows, the long term trend for fatal accidents has also reached a plateau. However note that in 1993 there were zero fatalities, and the SSF trustees see no reason why we can't return to this number. Every US glider pilot should dedicate themselves to obtaining the goal of making a significant long term reduction in the number of fatal soaring accidents.

2005 ACCIDENT SUMMARY

NUMBER OF ACCIDENTS

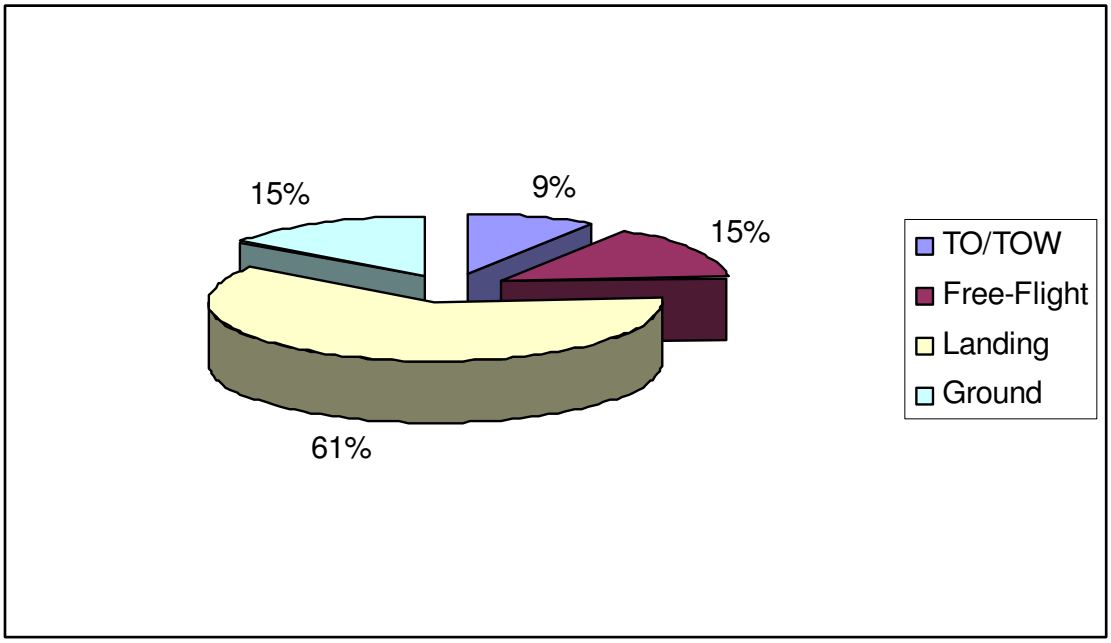
For the twelve month period ending December 31, 2005, 33 glider, motorglider, or towplane accidents meeting the reporting requirements of Part 830 of the Code of Federal Regulations were reported to the National Transportation Safety Board. The number of accidents reported during 2005 represents an increase of 12.1% in the number of accidents compared to the 29 accidents reported during 2004. The five-year average for the 2001 – 2005 reporting period is 32.0 accidents per year, a number that remains constant from the previous reporting period.



Summary of Soaring Accidents
2001 – 2005

While the average number of accidents has shown a steady decline since 1981 (averaging 45.6/year in the 80's, 38.6/year in the 90's and 32.2/year so far this decade) the yearly number of accidents remains unacceptably high. In addition, the average number of fatalities has remained just over 6 per year since the mid 1990's. In the 2005 reporting period six accidents resulted in fatal injuries to the pilot. In addition to the six fatalities, five pilots and one passenger received serious injuries while twenty-two pilots and six passengers received minor or no injuries during the 2005 reporting period. In a change from last year, no motorglider or tow plane pilots received fatal injuries in accidents involving accidents in those aircraft.

PHASE OF FLIGHT



Number of accidents that occur in various Phase's of Flight

The number of accidents that occur during the approach and landing phase of flight again far surpass those recorded during any other phase of flight. For the year, approach and landing accidents attributed to approximately 61% of the total number of accidents reported for the year. This percentage represents a slight increase from the 59% recorded during the 2004 reporting period. Takeoff accidents account for just over 9% of the number of accidents, meaning that over 70% of the number of accidents occurred during the takeoff and landing phase of flight.

It should come as no surprise that a majority of accidents occur during takeoff and landing, where the tolerance for error is greatly diminished and opportunities for pilots to overcome errors in judgment and decision-making become increasingly limited. This trend coincides with a 1985 National Transportation Safety Board study initiated to determine the phases of flight in which aircraft accidents are most likely to occur. The study concluded that approximately 60% of all aircraft accidents occur during the first two minutes or the last four minutes of the average flight, even though these flight phases typically account for less than 16% of actual flight time.

TAKEOFF ACCIDENTS

Premature termination of the tow (PT3) again accounted for both of the glider takeoff accidents that occurred during the 2005 reporting period. In addition, there were two motorglider accidents where the aircraft struck an object during the takeoff phase of flight.

The pilot of a DG-300 received minor injuries following an intentional release at 100 ft AGL. The towplane climbed at a steep angle and the glider was unable to follow. The glider stalled following the release and pilot was unable to effect a recovery before the impact occurred. The GPS flight recorder showed that the glider/towplane combination reached a maximum ground speed of 45 kts. *NTSB LAX05LA196.*

The pilot of a Grob 103 was uninjured, but the glider was substantially damaged following an intentional release at 75 – 100 ft AGL. The towplane/glider flew through a dust devil on take-off. During this event the towplane suffered a prop strike. The glider pilot observed a 'puff of smoke' come from the towplane so he released. The glider pilot executed a 90 degree turn to the right before the right wing tip impacted the terrain and separated from the aircraft. The 'puff of smoke' was determined to be the dust thrown into the air by the propeller strike. *NTSB DEN05LA108.*

The pilot of a Taifun 17E impacted trees on the departure end of the runway following a loss of climb performance. The pilot reported encountering a downdraft on the lee side of the tree line. The sinking airmass prevented the motorglider from climbing over the trees. *NTSB NYC05CA101.*

The glider flight instructor piloting a HK 36 TTC motorglider collided with a tractor following an aborted takeoff from a private strip. The instructor attempted to land the motorglider on a snow covered runway. The high airspeed resulted in the pilot deciding to reject the landing after rolling about 300 feet. The pilot then attempted to fly under the power lines obstructing the departure end of the runway. The left wing struck a parked tractor while maneuvering to avoid the power lines. *NTSB SEA06CA023.*

As the first 2 accidents indicate, a PT3 event may be the result of the pilot pulling the release at low altitude. The Soaring Safety Foundation has long stressed the importance of proper use of checklists and the need to minimize distractions to ensure that critical safety of flight items are accomplished prior to takeoff. Additionally, the SSF strongly encourages every pilot to develop and review an emergency plan prior to every takeoff. This plan should include actions the pilot will take at various altitudes in the event that an accidental or intentional release occurs.

The second 2 accidents show that external factors must be considered before beginning the take-off roll in a motorglider. A critical evaluation of the effect of wind and weather on the gliders expected climb performance must be accomplished before the launch is begun. Finally, but most importantly, it is critical for pilots to understand that a pilot's most basic responsibility is control of the aircraft. Regardless of the circumstances, FLY THE AIRCRAFT!

INFLIGHT ACCIDENTS

In the 2005 reporting period, five accidents were reported during the in-flight phase. These accidents occurred while the pilot was in free-flight, after release and before entering the landing pattern.

The first accident occurred when the pilot of a SGS2-32 entered a spin while on a sightseeing flight around Mokuleia, HI. The commercial pilot crossed over a ridge to show the passengers a waterfall. The pilot turned left in an apparent attempt to return to the airport, when the glider stalled and entered a left hand spin. A witness reported that the rotation stopped and immediately entered a right hand spin, which continued until it impacted the terrain. The pilot received fatal injuries while the passengers received minor injuries. *NTSB LAX05LA131*

The student pilot of an AC-4 Russia was fatally injured when the glider impacted the back side of a mountain ridge approximately 3 miles from the airport. The pilot had about 12 hours of flight experience in 2 place training gliders. This was his first flight in the AC-4 glider. *NTSB SEA05LA114.*

The private pilot of an ASW-20 was fatally injured and the glider destroyed, following a collision with mountainous terrain. The pilot made a radio call stating that he was going to transition northbound to another landmark. No further transmissions were received and the wreckage as located the next day at 11,600 ft MSL. *NTSB LAX05LA224.*

The commercial pilot of a SGS2-32 glider and his passenger received serious injures after the aircraft impacted a lake following a stall demonstration. The left wing dropped during the stall and a left hand spin ensued. The pilot was unable to recover and the glider impacted a lake in the spin attitude. The pilot and passenger managed to get out before the glider sank into 200 feet of water. *NTSB LAX05CA284.*

The ATP rated pilot of an ASH-26E motorglider was seriously injured after an in-flight breakup. The pilot was on an IFR flight plan when the glider broke apart after inadvertently entering a cloud. The pilot bailed out and was seriously injured in the parachute landing. *NTSB LAX06LA024.*

These accidents demonstrate the need to continuously evaluate how the flight is progressing and what options the pilot may have at his/her disposal. External or internal factors, such as pointing out objects on the ground, or handling multiple tasks while flying on an IFR flight plan can lead distractions. Fixations on a specific task or goal can also lead to conditions where safe flight conditions can no longer be maintained. Pilots should monitor their flight activities and use task shedding schemes to reduce pilot workload during times of stress. Finally, pre-flight planning and proficiency in the specific glider are important tasks that can not be overlooked if safe flight is to be maintained.

LANDING ACCIDENTS

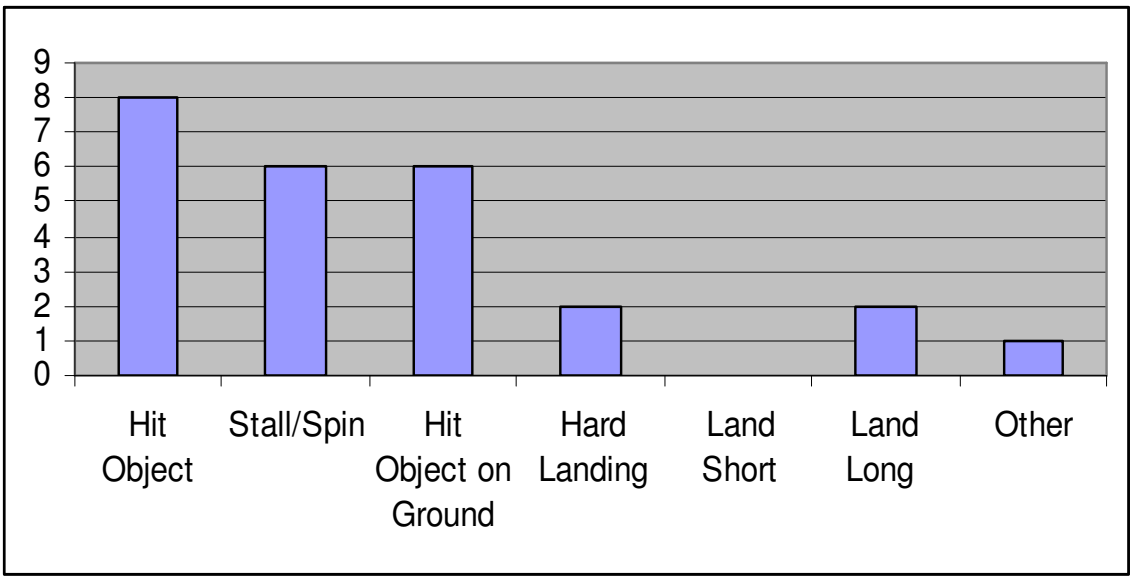
Accidents occurring during the landing phase of flight again accounted for a majority of injuries to pilots and damaged or destroyed gliders. For the 2005 reporting period, gliders hitting objects on final or during the landing roll accounted for the majority of the landing accidents. This was followed closely by stall/spin, land long, and hard landing accidents. The majority of the reported land short accidents occurred at the completion of local flights at the pilot's home airport. One important point to consider is that the higher the impact speed, the greater the chances of serious or fatal injuries occurring. A 50 kt impact contains 4 times as much energy as a 25 kt impact.

The pilot of a SGS1-26B was not injured following a collision with trees while executing an off-airport landing. The pilot got low and decided to execute an off-airport landing in an open field. While on final, in gusty wind conditions, the pilot reported encountering 'excessive sink' which caused the glider to strike a tree about 30 ft AGL. *NTSB DFW05CA075*.

The pilot of an ASW-27 was uninjured following a collision with trees during the landing. The pilot was entered the downwind leg and noticed a motorglider on the runway preparing to take-off. On final, the pilot mistakenly pulled spoilers while attempting to extend the flaps, causing the glider to strike trees along the arrival end of the runway. *NTSB MIA05CA075.*

The pilot a DG-600 was uninjured following an in-flight collision with a cactus while maneuvering to make an off-airport landing. When the glider was approximately 300 feet AGL, the pilot determined he would be unable to land at his original spot due to power lines at the approach end with a fence and shed at the far end of the field. The pilot then executed a 270

degree turn to land in the 'best part of a bad area'. The left wingtip struck a cactus causing the glider to pivot 70 degrees when the right wing struck another cactus. *NTSB DFW05CA096.*



Accidents during the Approach and Landing Phase of Flight

The pilot of a SGS 2-33A was uninjured follow a collision with a tree while executing a cross-wind airport landing. The student pilot was high entering the downwind leg so he added full spoilers to increase the descent rate. When opposite the intended touchdown area he started closing the spoilers to maintain the proper descent rate. Upon turning final the pilot had almost no spoilers and was still low on the glide slope. The glider was substantially damaged when it struck the last Oak tree and ground at the departure end of the runway. *NTSB CHI05CA119***.**

The pilot of a Grob G-103 received minor injuries while attempting to land at his home airport. The pilot was low on the downwind leg so he flew a tighter traffic pattern to compensate. The glider encountered sink and possibly an increased headwind, resulting in the glider sinking below glide slope. The glider was substantially damaged when it struck trees at the approach end of the runway. *NTSB NYC05CA097.*

The pilot of a Blanik L-33 was uninjured following a collision with the ground while attempting to land on the home airport. The pilot reported an encounter with extreme turbulence and a very rapid descent while on final. The glider was substantially damaged when the right wing contacted the ground and the glider ground-looped. *NTSB CHI05CA255*.

The pilot of a DG-300 received fatal injuries when the glider struck an embankment 200 feet short of the airport runway. According to witnesses, the glider was observed low on final before it struck the embankment. *NTSB ATL06LA008.*

The remaining landing accidents include problems associated with stall/spin, hard landings, undershoots, and overshoots. Note also, that of the seven accidents listed above, six (6) of them occurred while the pilot was attempted to land on the home airport. Of the twenty-one gliders

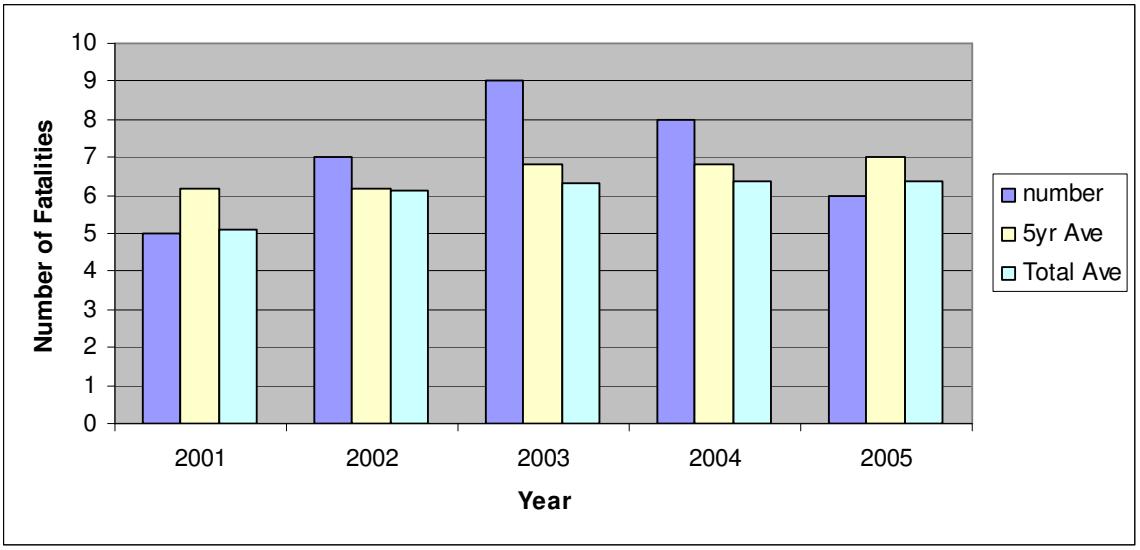
involved in landing accidents thirteen of them occurred while the pilot was attempting to land on an airport runway. Only 38.1% of the landing accidents occurred while the pilot was executing an off-airport landing.

While a detailed look at all landing accidents is beyond the scope of this report, the reader is encouraged to review the NTSB reports for additional details. One point that should be made is that many pilots report encountering 'heavy sink' on short final. There are numerous reasons for this, and one of the most insidious is a condition known as wind gradient. It is well know that wind speeds can, and do, vary with altitude. A wind gradient is a gradual change in wind speed with altitude. When a gradient, or shear, is encountered the forces acting on the glider change and the glider responds to these changes.

One noticeable change is an increase in the gliders sink rate with a reduction in wind speed. All pilots need to be trained to recognize and respond to wind gradient/shear conditions. The SSF's goal orientated approach can help pilots accomplish this task.

FATALITIES

Six individuals were fatally injured participating in glider operations during the 2005 reporting period. This represents a slight decrease from the eight fatalities reported for the previous year.



Summary of Fatalities
2001 – 2005

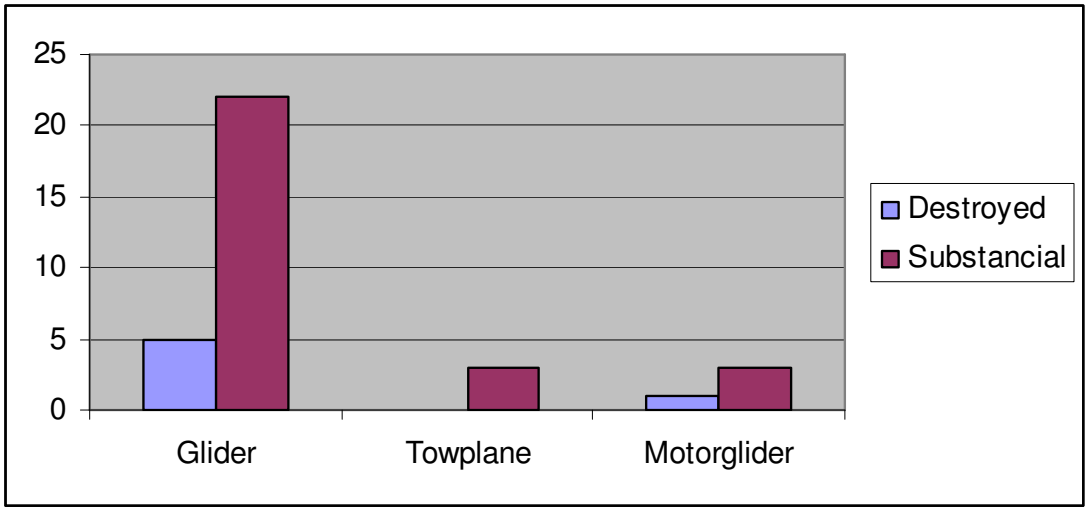
All six of the individuals fatally injured in accidents in 2005 were piloting a glider. Serious injuries to individuals participating in glider operations increased slightly from the previous reporting period. Minor injuries to individuals involved in accidents decreased significantly.

For the five-year period 2001 – 2005, 35 fatalities occurred. This equates to a five year average of 7.0 fatalities per year a slight increase from the previous 5 year period. . While the 5 year average is down from the initial rate of 7.2 fatalities per year recorded in 1991, the long term trend is not encouraging. In addition, while the trend for the number of accidents is moving in the right direction, the number of fatalities is remaining constant.

An analysis of the accident data in the 2005 reporting period shows that stalls and stall/spin events were a causal factor in 50% (3 of 6) of the fatal accidents. One Commercial rated, four private rated, and one student rated pilots were involved in these fatal accidents. Every glider and tow plane pilot must evaluate their operation to help reduce the number of fatalities. Remember the old adage - aviate, navigate, communicate.

DAMAGE TO AIRCRAFT

Five gliders were reported destroyed and twenty-two gliders received substantial damage as a result of accidents in the 2005 reporting period. Three tow planes and three motorgliders received substantial damage and one motorglider was reported as destroyed.



Damage to Aircraft

AUXILIARY-POWERED SAILPLANES

For the twelve month period ending December 31, 2005, four accidents involving auxiliary powered sailplanes were reported to the National Transportation Safety Board. One pilot received serious injuries while the remaining 3 pilots were uninjured. This represents an increase in the number of accidents when compared to the previous year, but a decrease in the number of fatalities.

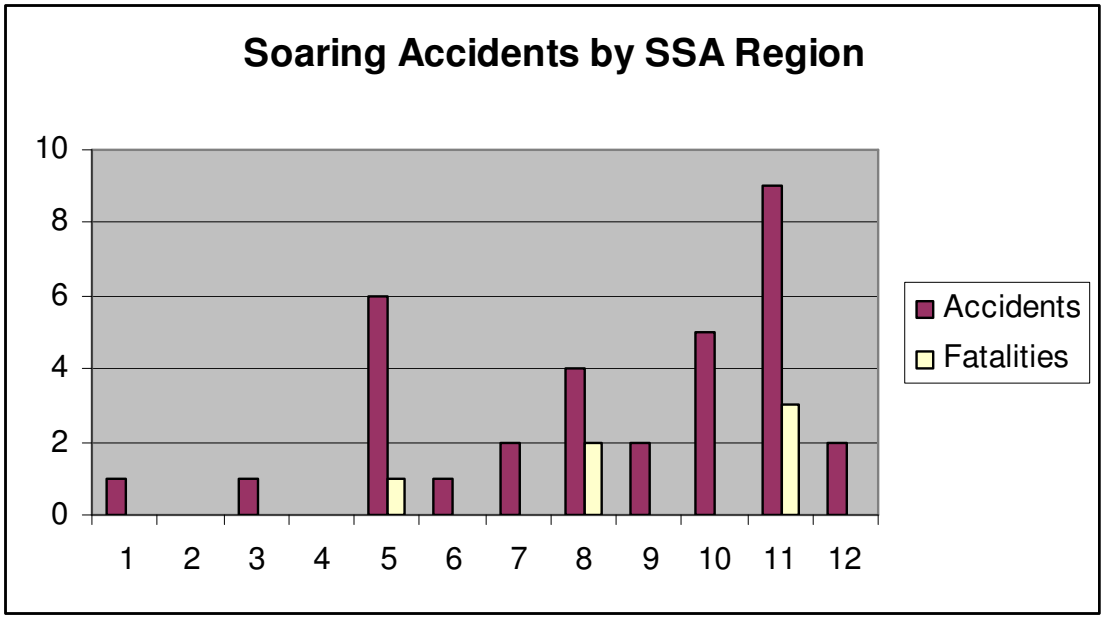
An ASH-26E was destroyed following in in-flight breakup after the pilot inadvertently entered a cloud while wave flying. A Taifun 17E and HK 36 TTC motorglider was substantially damaged during take-off phase of flight.

A Scheibe SF-28A motorglider was substantially damaged following an off-airport landing. The pilot was performing an engine-off landing and while on final the airspeed indicator showed a sudden drop to 20 mph. The pilot closed the spoilers and lowered the nose causing the airspeed indicator to suddenly increase to 70 mph. The pilot determined that there was insufficient runway to complete the landing so an off-airport landing site was chosen. The motorglider stalled and impacted the ground in a wing low attitude. *NTSB SEA05LA137.*

Motorgliders offer the pilot a chance to operate without a traditional ground crew. This places a larger burden on the pilot to ensure that the glider is properly prepared for flight and environmental factors will not create a take-off hazard. In a change from last year, no motorgliders were involved in fuel management accidents. However, two motorgliders were damaged after striking objects during the take-off phase of flight. Motorglider pilots should carefully evaluate the wind and weather conditions before beginning the take-off roll and determine a set of Emergency plans that could be accomplished if the glider isn't performing within expected parameters.

ACCIDENTS BY SSA REGION

A comparison of the geographic locations of accidents in relation to SSA Regions tends to reflect the geographic distribution of the SSA membership. In general, those regions having the greatest populations of SSA members and soaring activity tend to record the highest numbers of accidents[2].



Accidents by SSA Region

ACCIDENTS INVOLVING TOW AIRCRAFT

During 2005, three accidents involving tow aircraft occurred during the landing phase of flight. One commercially rated and two privately rated pilots received no injuries as a result of these accidents, but all three airplanes were substantially damaged during the event.

A Piper Pawnee (PA-25-235) was substantially damaged and the commercially rated pilot was uninjured when the airplane struck a sign while the pilot was performing a forced off-airport

[2] See Appendix A for more details

landing. During the 12th tow of the day the engine quit at 1000 ft AGL. The tow-pilot signaled for the glider to release and pilot maneuvered the airplane for a landing on a road near the airport. The airplane struck a sign during the landing roll, causing damage to the left win spar. *NTSB LAX05LA224.*

A Bellanca 8GCBC 'Scout' was substantially damaged when it nosed over after a long landing. The private pilot was not injured in the accident. Following a normal tow, a pilot-rated witness reported the airplane appeared to make a high overshooting turn to final, followed by an aggressive side-slip. The airplane then floated past the midfield point of the runway, touched-down, bounced, and touched-down again. The pilot applied excessive braking, causing the airplane to nose over. *NTSB MIA05CA097.*

A Piper Pawnee (PA-25-235) was substantially damaged while the private rated pilot was uninjured when the airplane struck a tree during an off-airport landing. The 12th tow of the day resulted in the Pawnee being 3000 ft AGL and 2 miles from the airport when the engine quit. The pilot entered a left downwind for runway 17, and then executed a right 360 degree turn to lose altitude. The airplane stalled or entered an incipient spin from which the pilot recovered, but this left the airplane unable to make the runway. The left wing, strut, and landing gear were damaged in the impact. Examination of the fuel system showed that there was no fuel on board. *NTSB DFW05CA146.*

Fuel mismanagement accidents continue to plague our towpilots. There are few reasons to begin the take-off roll when you are not certain there is enough fuel on board to complete the flight. Each club, chapter, or commercial operator should know how much fuel each towplane will burn during the tow operation. Shutting down the operation long enough to refuel is far less costly than trying to find a replacement towplane when yours is damaged in a landing accident. Towpilots must also resist the temptation to "do just one more tow".

FLIGHT TRAINING AND SAFETY REPORT

As the 2005 statistics show, the majority of soaring accidents occur in the approach and landing phase of flight. For one reason or another, the pilot fails to make it to the landing area. Pilots need to consider multiple factors including: other traffic, wind, lift/sink, location, and distance remaining to the landing area in order to safely land a glider. Failure to account for one or more of these factors can leave the pilot low on the approach with very few corrective options available.

Pilots should consider that there are numerous 'tools' or maneuvers that can be used to correct an overshoot condition. These include slips (forward and turning), more spoilers, full spoilers plus increased airspeed, and 'S' turns on final. These flight maneuvers increase the sink rate of the glider – allowing for a steeper approach, or increase the flight time – allowing the glider to loose more altitude. In contrast closing the spoilers and increasing the airspeed is the only available 'tool' when the undershoot condition is detected. Pilots should practice, with a qualified instructor, the techniques and maneuvers needed to land safely from an overshoot condition, and they should refrain from putting themselves in an undershoot position.

One approach to this is the SSF's 'goal oriented' approach technique that requires the pilot, student or otherwise, to continuously evaluate the gliders altitude, position, speed, and direction to determine if it can successfully reach the intended landing spot. If that goal is in doubt, the

pilot should change the glider's path or configuration to reacquire the goal. If it becomes impossible to reach the goal, a new landing spot should be selected and the process begun again.

Another tool that pilots and instructors should consider is that GPS recorder you installed to document your flight. Low-cost hand-help GPS units are available on the used market and can be carried in the training glider. The approach and landing portion of the flight can be extracted from the recorder and displayed to determine how the pilot is handling various conditions. It is also possible to download other pilot's traces from multiple Internet web sites (e.g., OLC) and examine how others tackle this demanding task.

Takeoff accidents, though rare, are particularly frustrating because they usually avoidable. Both glider and launch vehicle are sitting on the ground before the launch begins. In 2005 two accidents occurred after the glider pilot intentionally terminated the tow at low altitude and then failed to execute the appropriate emergency landing procedures. Pilots can mentally prepare for an emergency and develop a specific set of action plans to deal with several contingencies. The task is then to execute the proper plan at the proper time. Flight instructors should continue to emphasize launch emergencies during flight reviews, club check rides and flight training.

Adding the letter "E" to the pre-takeoff checklist is a helpful reminder to concentrate on the emergency plan of action. Treating the wing runner as a member of the launch crew and using good Crew Resource Management (CRM) techniques can reduce the pilot's pre-launch workload. The wing runner can remind the pilot of the possibility of a launch emergency ("Are you ready for an emergency?") and be observant for various discrepancies such as: dive brakes left open, canopy unlatched, tail dolly left on, or positive control check not accomplished. Fixing any problem before beginning a launch will help reduce the take-off type of accident.

The tow pilot also needs special training to be alert for signs of potential trouble. Is the glider pilot being hurried? Are conditions too gusty; is there fuel in the tow plane? In 2005 two tow-planes were substantially damaged when they ran out of fuel during a tow operation. Is the takeoff area clear of people and other obstructions? Has the tow pilot added the letter "E" to the pre-takeoff checklist and is he/she prepared for an emergency? Tow planes need a good rear view mirror, one that is located close to the tow pilot. Radios are highly recommended.

Flight instructors play an important safety role during everyday glider operations. They need to supervise flying activities and serve as critics to any operation that is potentially unsafe. Other pilots and people involved with the flying activity also need to be trained to be alert to any safety issues during the daily activity.

The FAA has mandated that all instructors must include judgment training in the flight training process. Examiners will check for this training during the flight test. The FARs require that all flight instructors provide some kind of aeronautical judgment training during pilot training flights (student, private, commercial, and flight instructor). FAR 61.56 flight reviews also offer the flight instructor an opportunity to reach the glider pilot population on a continuing basis. Stressing judgment skills, as well as piloting skills, can help reduce the accident rate in the United States.

APPENDIX A

Request for Club, Chapter, and Commercial Operator information

The Soaring Safety Foundation is tasked with evaluating US soaring accidents and developing plans that can help reduce these accidents. Since 1981 the SSF has developed and implemented numerous programs and ideas. While the accident rates are trending in the right direction, one serious question remains. How can the SSF generate meaningful accident statistics?

The difficulty is that the SSF can easily obtain the raw number of accidents (the accident rate), but it has few if any means to turn these raw numbers into meaningful statistics. Most aviation accident statistics are reported as a fraction or percentage of accidents per flights or accidents per flight hours. To obtain these statistics the SSF needs to know the number of flights or the number of flight hours. Historically, these flight numbers/hours have not been made available to the SSF.

Other aviation general aviation groups calculate their flight numbers/hours by noting the gallons of aviation gas sold throughout the US. Statistical analysis methods can be used to determine the average fuel burn rate for the fleet of general aviation airplanes. Thus, these aviation groups can compute meaningful accidents statistics. Since gliders use little or no fuel, we do not have an easy way to generate the flight number/hours valued needed to create meaningful statistics.

The SSF needs the support of a majority of the clubs, chapters, and commercial operators in the US to help correct this problem. Only by voluntarily submitting this information can the SSF really achieve its goal of reducing accidents. Once the SSF trustees have these number we can combine them with the raw NTSB accident numbers to generate meaningful statistics.

What can your club, chapter, or commercial operator do? At a minimum send the SSF trustees the number of annual number of launches and the total flight time that your club ships performed. This should easily come from your club records. If you also launch private gliders, then estimate the total flight time for these gliders. These two numbers would greatly help the SSF and they will be considered strictly confidential unless otherwise specified.

Do you want to do more? Then send us as much additional detail as you feel comfortable doing. One option would be to extract your club records into an Excel spread sheet and email the file to the SSF. The more details we have, the more analysis we can perform.

One word of caution, in order for these numbers to be statistically valid, we must get details from a majority of the clubs, chapters, and commercial operators. If not, then the number will be skewed and could reflect specific operator issues instead of national trends. Thus, the SSF needs the support from a large portion of the soaring community.

Email your report to any SSF trustee. Rich Carlson <rcarlson501@comcast.net>, Burt Compton <burtcompton@aol.com>, Gene Hammond <grauchy@sbcglobal.com>, Bernald Smith <bernald@juggernaut.com>, Bob Wander <soarbooks@aol.com>, or the generic SSF Webmaster <webmaster@soaringsafety.org>.

SSA REGIONS

Region 1 Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont.

Region 2 New Jersey, New York (south of 42nd parallel), Pennsylvania (east of 78th meridian).

Region 3 New York (north of 42nd parallel), Pennsylvania (west of 78th meridian).

Region 4 Delaware, District of Columbia, Maryland, Virginia, West Virginia.

Region 5 Alabama, Florida, Georgia, Mississippi, North & South Carolina, Tennessee, Puerto Rico, The Virgin Islands.

Region 6 Indiana, Kentucky, Michigan, Ohio.

Region 7 Illinois, Iowa, Minnesota, Missouri (east of 92nd meridian), North & South Dakota, Wisconsin.

Region 8 Alaska, Idaho, Montana, Oregon, Washington.

Region 9 Arizona, Colorado, New Mexico, Utah, Wyoming.

Region 10 Arkansas, Kansas, Louisiana, Missouri (west of 92nd meridian), Nebraska Oklahoma, Texas.

Region 11 California (north of 36th parallel), Guam, Hawaii, Nevada.

Region 12 California (south of 36th parallel).

APPENDIX B

NTSB Part 830

The responsibility for investigation of aircraft accidents in the United States was mandated by Congress to the National Transportation Safety Board (NTSB) through The Department of Transportation Act of 1966. This act tasked the NTSB with determining the probable cause of all civil aviation accidents in the United States.

From 1991 - 94, the general aviation community alone accounted for approximately 1,800 aircraft accidents per year. Due to this high level of investigative workload and limited available resources, the NTSB often delegates to the Federal Aviation Administration (FAA) the authority to investigate accidents involving aircraft weighing less than 12,500 pounds maximum certified gross weight. Consequently, many glider accidents meeting the NTSB reporting criteria are investigated by representatives of the FAA.

All aircraft accidents involving injury to passengers or crewmembers or substantial damage to the aircraft must be reported to the NTSB.

The terms used in this report to define injury to occupants and damage to aircraft are included in NTSB Part 830 of the Code of Federal Regulations.

Definitions

Aircraft - a device that is used or intended to be used for flight in the air.

Operator - Any person who causes or authorizes the operation of an aircraft.

Aircraft Accident - An occurrence associated with the operation of an aircraft which takes place between the time any person boards the aircraft with the intention of flight and all such persons have disembarked, and in which any person suffers death or serious injury, or, in which the aircraft receives substantial damage.

Fatal Injury - Any injury which results in death within 30 days of the accident.

Serious Injury - Any injury which:

1) Requires hospitalization for more than 48 hours, commencing within 7 days from the date the injury was received;
2) Results in the fracture of any bone except simple fractures of fingers, toes, or nose;
3) Causes severe hemorrhages, nerve, muscle, or tendon damage;
4) Involves any internal organ; or
5) Involves second- or third-degree burns, or any burns affecting more than 5 percent of the body surface.

Minor Injury - Injury not meeting the definition of fatal or serious injury.

Substantial Damage - Damage or failure which adversely affects the structural strength, performance, or Flight characteristics of the aircraft, and which would normally require major repair or replacement of the affected component. Engine failure or damage limited to an engine if only one engine fails or is damaged, bent fairings or cowling, dented skin, small punctured holes

in the skin or fabric, ground damage to rotor or propeller blades, and damage to landing gear, wheels, tires, flaps, engine accessories, brakes, or wingtips are not considered substantial damage for the purpose of this part.

Destroyed - Damage to an aircraft which makes it impractical to repair and return it to an airworthy condition. This definition includes those aircraft which could have been repaired, but were not repaired for economic reasons.

Minor Damage - Damage to an aircraft that does not meet the definition of Substantial or Destroyed.

APPENDIX C

Phase of Operation

Ground Movement - Repositioning of the glider while on the ground. To meet the definition of an accident, occupants must be onboard the glider and movement must be conducted immediately preceding or subsequent to a flight operation that demonstrates the intention of flight. This includes taxi operations of auxiliary-powered sailplanes.

Takeoff - Begins at initiation of the launch operation, including aero-tow, ground launch, and self-launch, and is concluded at the point the glider reaches the VFR traffic pattern altitude. For ground launch operations, the takeoff phase continues until release of the towline.

Assisted Climb - Begins at the conclusion of the takeoff phase or point at which an auxiliary powered sailplane or a sailplane using an aero-tow launch climbs above traffic pattern altitude. This phase of operation is not included in ground launch operations.

In-flight - Begins at the point of release of the towline for all launch types and concludes at the point of entry into the traffic pattern or landing approach pattern for an off-airport landing.

Approach/Landing - Begins at the point of entry into the traffic or landing approach pattern and concludes as the glider is brought to a stop at the completion of the ground roll.

APPENDIX D

Accident Category Definitions

Hit Obstruction - Accident occurring during a ground or flight phase as a result of the glider colliding with a fixed object. This classification does not include bird strikes or ground / in-flight collisions with other aircraft.

Ground Collision - Collision of two or more aircraft while being repositioned or taxied while on the ground.

Loss of Directional Control - Accident which occurs as a result of a loss of directional control of the glider during takeoff or landing operations while the glider is on the ground.

Premature Termination of the Tow (PT3) - Any event, pilot, mechanical, or otherwise induced, which results in a premature termination of the launch process. This classification includes ground, aero-tow, and self-launch.

Mechanical - An event that involves a failure of any mechanical component of the glider. This classification includes accidents that result from faulty maintenance or a failure to properly install or inspect primary flight controls. In-flight structural failures caused by fatigue of structural components or pilot induced overstress of the airframe are included in this classification category.

Loss of Aircraft Control - An accident which occurs as a result of the loss of control of the glider for any reason during takeoff, assisted climb, in-flight, or approach / landing. This classification includes failure to maintain proper tow position during assisted climb.

Mid-air Collision - A collision of two or more aircraft which occurs during the takeoff, assisted climb, in-flight, or approach / landing phase of flight. This classification includes collisions involving gliders and other categories of aircraft (airplane, rotorcraft, etc.).

Land Short - Any accident which occurs as a result of the glider being landed short of the physical boundaries of the intended runway or landing area. This classification includes off airport landing operations.

Land Long - Any accident which occurs as a result of the glider being landed beyond the physical boundaries of the intended runway or landing area. This classification includes off airport landing operations.

Stall / Spin - Any accident which results from the inadvertent stall and/or spin of the glider during takeoff, assisted climb, in-flight, or approach / landing phases of flight.

Hard Landing - Any accident caused by a hard landing during the approach / landing phase of flight.

Other – Any accident caused by factors not defined within the previous categories.